

Michigan.—1st, 8th, 11th, 12th, 13th, 17th, 20th, 21st, 28th, 29th.
Minnesota.—11th, 12th, 17th, 19th.
Mississippi.—7th, 13th.
Missouri.—1st to 7th, 8th, 11th, 12th, 13th, 30th.
Montana.—1st, 10th, 13th, 15th.
Nebraska.—3d, 4th, 7th, 8th, 11th, 17th, 18th, 27th.
New Hampshire.—9th, 22d.
New Jersey.—1st, 4th, 5th, 9th, 15th.
New Mexico.—27th.
New York.—1st, 3d, 4th, 8th, 9th, 13th, 15th, 18th, 21st, 22d.
North Carolina.—3d, 4th, 14th, 15th, 16th, 29th.
Ohio.—1st, 3d, 4th, 8th, 9th, 12th, 13th, 14th, 18th, 19th, 23d.
Oregon.—5th, 9th.
Pennsylvania.—1st, 3d, 4th, 8th, 9th, 18th, 22d, 29th.
South Carolina.—1st, 4th, 5th, 9th, 11th, 14th, 15th, 19th, 29th, 30th.
Tennessee.—2d to 5th, 8th, 9th, 12th to 15th, 18th, 25th, 29th, 30th.
Texas.—1st to 17th, 21st, 22d, 27th to 30th.
Utah.—11th, 12th, 25th.
Vermont.—1st, 9th, 22d.
Virginia.—4th, 5th, 8th, 9th, 14th, 23d.
Washington Territory.—9th, 14th, 15th.
West Virginia.—3d, 4th, 8th, 22d.
Wisconsin.—2d, 8th, 11th, 12th, 17th, 19th, 27th.
Wyoming.—25th.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various states and territories, as follows:

Arizona.—Prescott, 5th.
California.—San Diego, 1st, 2d, 5th, 13th; San Francisco, 4th, 7th, 14th, 28th; Sacramento, 8th; Poway, 5th.
Colorado.—Montrose, 3d, 8th.
Dakota.—Webster, 4th; Fort Buford, 15th, 21st; Fort Totten, 19th; Yankton, 27th.
Florida.—Archer, 4th, 17th, 19th, 20th; Key West, 13th, 16th, 21st; Manatee, 15th.
Georgia.—Augusta, 19th, 26th.
Illinois.—Springfield, 1st, 3d, 5th, 26th; Charleston, 1st, 5th, 11th, 27th; Riley, 4th.
Indiana.—Jeffersonville, 11th, 15th; Laconia, 26th.
Indian Territory.—Fort Reno, 20th.
Iowa.—Cedar Rapids, 1st, 5th, 10th, 13th, 14th, 16th, 21st; Keokuk, 1st, 11th.
Kansas.—Yates Centre, 4th.
Maine.—Cornish, 8th.
Maryland.—Woodstock, 20th, 27th.
Massachusetts.—Amherst, 22d.
Michigan.—Swartz Creek, 6th; Port Huron, 12th, 18th; Grand Haven, 26th, 27th.
Minnesota.—Saint Vincent, 8th; Duluth, 9th.
Missouri.—Saint Louis, 4th.
New Jersey.—Somerville, 21st.
New York.—Mountainville, 4th; Buffalo, 7th, 8th, 11th, 12th, 14th, 24th, 28th, 29th; Palermo and Syracuse, 8th; Albany, 17th; New York City, 21st.
North Carolina.—Fort Macon and Statesville, 17th.
Ohio.—Wauseon, 7th, 27th, 30th; Toledo, 27th; Cleveland, 29th.
Pennsylvania.—Philadelphia, 6th; Dyberry, 21st, 22d; Troy, 22d.
Rhode Island.—Block Island, 21st.
South Carolina.—Stateburg, 8th, 9th, 16th, 17th, 18th, 26th; Spartanburg, 12th, 17th.
Tennessee.—Nashville, 6th, 9th, 15th, 16th, 17th, 26th; Chattanooga, 19th.

Vermont.—Strafford, 8th.
Virginia.—Cape Henry, 9th; Lynchburg, 20th, 27th; Dale Enterprise, 22d, 27th to 30th.
Washington Territory.—Dayton, 16th; Bainbridge Island, 17th.
Wisconsin.—Milwaukee, 6th; Manitowoc, 11th.
Wyoming.—Fort Bridger, 3d, 5th, 29th.

LUNAR HALOS.

Lunar halos were observed in the various states and territories, as follows:

Alabama.—Mobile, 17th, 18th, 20th; Montgomery, 18th.
Arizona.—Fort Apache, 23d.
Arkansas.—Fort Smith, 14th; Little Rock, 18th.
California.—Fort Bidwell, 27th, 28th.
Colorado.—Montrose, 20th.
Connecticut.—Bethel, New Haven, and North Colebrook, 21st.
Dakota.—Fort Totten, 15th; Fort Buford, 21st; Webster, 19th.
Florida.—Manatee, 14th; Jacksonville, 16th; Archer, 16th, 19th; Cedar Keys, 16th, 23d; Key West, 16th, 17th, 19th, 20th, 24th, 26th; Tallahassee, 17th; Sanford, 23d, 24th.
Georgia.—Atlanta, 15th, 17th.
Idaho.—Boisé City, 3d.
Illinois.—Peoria, 26th.
Indiana.—Terre Haute, 17th; Jeffersonville, 19th, 21st, 22d, 23d.
Iowa.—West Union, 22d; Keokuk, 26th.
Kansas.—Wyandotte, 23d, 28th.
Kentucky.—Frankfort, 20th.
Louisiana.—New Orleans, 15th; Point Pleasant, 16th.
Maine.—Bangor, 17th.
Maryland.—Ocean City, 20th; Baltimore, 20th, 27th.
Massachusetts.—Amherst and Deerfield, 20th; Boston, Somerset, and Taunton, 21st.
Michigan.—Manistique, 17th; Escanaba, 17th, 19th; Marquette, 17th, 27th; Alpena and Swartz Creek, 19th; Grand Haven, 26th, 27th.
Minnesota.—Duluth, 19th; Saint Paul, 21st.
Montana.—Fort Benton, 18th; Fort Assinaboine, 19th; Fort Maginnis, 20th; Poplar River, 21st.
Nebraska.—Marquette, 8th.
New Jersey.—Barnegat City, Somerville, Dover, and Princeton, 21st; Readington, 21st, 29th.
New York.—Menand Station (near Albany), 20th; New York City, Mountainville, and Setauket, 21st.
North Carolina.—Wilmington, 5th, 17th; Hatteras, Statesville, and Flat Rock, 17th.
Ohio.—Tiffin, 17th; Wauseon, Sandusky, and Toledo, 27th; Ruggles, 29th.
Oregon.—Linkville, 16th.
Pennsylvania.—Pittsburg, 20th; Philadelphia, Fallsington, and Chambersburg, 21st.
Rhode Island.—Point Judith and Block Island, 21st.
South Carolina.—Spartanburg, 14th, 16th, 26th; Stateburg, 18th.
Tennessee.—Nashville, 15th, 16th; Chattanooga, 15th, 18th, 21st; Knoxville, 17th.
Texas.—Cleburne, 13th; Indianola, 15th, 16th, 20th, 21st; Brownsville, 16th, 17th, 18th; Rio Grande City, 17th, 19th, 20th; Galveston, 20th, 23d; Palestine, 24th.
Virginia.—Cape Henry, 8th, 27th; Bird's Nest, 15th, 20th, 26th, 27th; Wytheville, 17th, 18th, 19th; Dale Enterprise, 17th, 27th, 30th; Fort Myer and Chincoteague, 20th.
Washington Territory.—Tatoosh Island, 13th.
West Virginia.—Parkersburg, 20th.
Wisconsin.—Embarras, 17th; Milwaukee, 28th.
Wyoming.—Fort Laramie, 16th, 17th.

The phases of the moon during September were: last quarter, 2d, 12.09 a. m.; new moon, 8th, 3.37 p. m.; first quarter, 16th, 1.09 a. m.; full moon, 24th, 2.49 a. m.; perigee, 6th, 9 a. m.; apogee, 18th, 5.24 a. m.

MIRAGE.

Huron, Dakota, 5th: a remarkably distinct mirage was observed to the east of this station from 8 to 8.40 a. m. The towns of Cavour and Iroquois, distant, respectively, eight and eighteen miles, were clearly visible, as though only a short distance intervened. A train of cars, distant to the eastward about twenty-five miles, was seen, apparently, in mid-air. Houses, barns, grain-stacks and other objects assumed vast proportions.

New London, Connecticut, 19th: Race Rock light-house and other objects were apparently elevated five degrees above their natural position.

Mackinaw City, Michigan, 23d: a very distinct mirage was observed from 9.05 a. m. to 9.15 p. m., showing the image of a two-masted schooner in mid-air, over Mackinaw Island, about ten miles distant.

Mirages were also observed at the following places:

Webster, Dakota, 1st, 3d to 5th, 9th, 15th, 17th to 19th.

Saint Vincent, Minnesota, 6th.

Marquette, Nebraska, 29th.

Spartanburg, South Carolina, 8th.

MISCELLANEOUS PHENOMENA.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and seventy-one stations show 5,053 observations to have been made, of which four were reported doubtful; of the remainder, 5,049, there were 4,487, or 88.9 per cent., followed by the expected weather.

SUN SPOTS.

Prof. David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for September, 1885:

Date— September, 1885.	No. of new.		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 8 a. m...	1	3	0	0	1	3	4	90†	
2, 10 a. m...	1	10†	0	0	0	0	5	100†	
3, 1 p. m...	0	0	0	10†	0	0	5	85†	
4, 10 a. m...	0	0	1	10†	0	0	4	70†	
6, 2 p. m...	0	0	0	0	0	0	3	45†	
7, 10 a. m...	0	0	0	5†	0	0	3	35†	
8, 8 a. m...	1	10†	0	15†	1	10†	4	30†	
11, 6 a. m...	0	0	0	0	0	0	2	15†	
12, 5 p. m...	0	0	1	3	0	0	1	12†	
14, 11 a. m...	2	25†	0	0	1	1	3	40†	
16, 8 a. m...	0	10†	1	15†	0	0	2	20†	
17, 3 p. m...	1	1	0	0	1	1	3	25†	
20, 10 a. m...	0	0	0	0	0	0	2	3	
21, 2 p. m...	2	12†	0	0	2	5	3	15†	
24, 11 a. m...	0	0	0	0	0	0	4	35†	
26, 4 p. m...	0	0	0	0	0	0	5	65†	
27, 5 p. m...	1	2	0	0	0	0	6	35†	

Facule were seen at the time of every observation.

† Approximated.

SUNSET DISPLAYS

Concerning sunset displays, the following notes have been received:

Windsor, Shelby county, Illinois: very brilliant sunset displays occurred from the 14th to the 27th.

Sunman, Ripley county, Indiana: the sunsets throughout the month have been similar to the displays of the autumns of 1883 and 1884, though not so bright.

Logansport, Cass county, Indiana: brilliant sunsets were observed on the evenings of the 1st, 14th to 18th, 21st to 27th; those of the 14th, 15th, 17th, 18th, and 23d were unusually bright.

Cedar Rapids, Linn county, Iowa: remarkably bright sunsets were observed from the 10th to 20th.

Des Moines, Iowa: on nearly every clear morning and evening during the month sun-glows were observed.

Wellington, Sumner county, Kansas: brilliant twilight glows were observed without interruption from the 13th to the close of the month, those of the 22d and 23d being especially bright.

Elk Falls, Elk county, Kansas: exceptionally brilliant sunsets were observed on the 21st and 22d.

Genoa, Nance county, Nebraska: during the last two weeks of the month the brilliant glow in the western sky at sunset was very noticeable.

Auburn, New York: the sunsets during the month have been remarkably brilliant.

Embarras, Waupaca county, Wisconsin: bright sunset displays were observed on nearly every clear evening during the month, some of the displays being remarkably brilliant.

Dale Enterprise, Rockingham county, Virginia: the sun-glows during the month were very brilliant.

The following is an extract from the "Bulletin of the New England Meteorological Society" for September, 1885:

The color of the skies after sunset again deserves note. Many observers record special coloring on dates from the 12th to the end of the month. The colors are variously described as orange, crimson, and pink, and the illumination reported as lasting from one-half an hour to over one hour after sunset.

DROUGHT.

Lynchburg, Virginia, 18th: in many sections of this state and in North Carolina no rain has fallen during the last six weeks. The tobacco crop has suffered seriously.

Reidsville, Rockingham county, North Carolina: up to September 20th an unprecedented drought prevailed in this vicinity. The creeks and wells in the surrounding country were nearly dry. It is estimated that in Caswell and Rockingham counties not more than one-half of an average tobacco crop will be produced.

Nashville, Tennessee, 26th: severe drought now prevails in this part of the state. The grass, which two weeks ago was in promising condition, has dried up, and farmers are feeding their stock with winter provender. Owing to the dryness of the soil, ploughing for winter wheat has been retarded.

Amherst, Hampshire county, Massachusetts: severe drought prevailed in this section at the close of the month. The total rainfall for the month was less than one inch.

Yellow Springs, Greene county, Ohio, 30th: during the last seventeen days of the month no rain fell in this vicinity.

Northfield, Rice county, Minnesota, 30th: no rain fell during the last decade of the month, and at the close of the month pastures were suffering in consequence of drought.

Helvetia, Randolph county, West Virginia, 30th: severe drought has prevailed in this region during the month. Pastures have failed, and the water-supply for stock has become insufficient in some localities.

New York City, 30th: drought has prevailed in this vicinity and on Staten Island during the month. In many places wells and cisterns were entirely exhausted, and crops have been damaged to a great extent.

Dale Enterprise, Rockingham county, Virginia, 30th: severe drought prevailed in this locality during the entire month. Farming operations have been seriously retarded, and the water-supply for stock and household uses has been limited.

Wytheville, Wythe county, Virginia, 30th: at the close of the month the ground was unusually dry and the streams were very low.

EARTHQUAKES.

Toronto, Ontario, 4th: quite a severe shock of earthquake was felt in the villages of Campbellford, Hastings, and Norwood, east of here, at 9.40 a. m. of the above date.

Los Angeles, California, 13th: a very perceptible shock of earthquake is reported to have been felt in this city at 4 a. m. The tremor was from southwest to northeast.

San Diego, California, 13th: two slight shocks of earthquake, separated by an interval of about three seconds, were distinctly felt at 7.34 a. m. (eastern time). The wave passed from east to west, and ended with a peculiar jar which produced an effect similar to that caused by a train when suddenly brought to a stand. The two shocks, with the interval between them, were of about twelve seconds' duration.

Poway, San Diego county, California, 13th: two distinct shocks of earthquake were felt at 4 a. m.